"Neither a wise man nor a brave man lies down on the tracks of history to wait for the train of the future to run over him." Quote from Dwight D. Eisenhower.

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Federal Communications Commission
Washington, DC, 20554
Via electronic filing
Docket number WTB 18-122,
Use of C-band Frequencies for other terrestrial services

To the Commission:

I am opposed to any invasion of the current C-Band Satellite system by any other mode of operation. I firmly believe that I also speak for my fellow engineers at Munn-Reese and our broadcast clients.

I was disturbed to read Chairman Pai's speech to the Wireless Infrastructure Association, The Connectivity Expo at Charlotte, NC, May 23, 2018. DOC-350919A1.pdf

It was this one paragraph that called me to action.

Paragraph 29 is quoted here:

"I've got some good news to report on the mid-band front. Last year, the FCC agreed to explore repurposing more mid-band spectrum, including the 3.7 to 4.2 GHz band, commonly called the "C band." We have done a lot of work on this issue in the time since enough so that I'm pleased to announce today that at the FCC's July meeting, I intend to put up for a vote a proposal to make more intensive use of that 500 MHz of spectrum, including seeking additional input on making it available for commercial terrestrial use."

That statement sounds like Chairman Pai has made up his mind before all the facts are in. History has a very strange way of repeating itself.

The Commission is currently promoting C-Band Receive Only Earth Station registration to find out how many units are in service. The men here at Munn-Reese are feverishly working to complete Receive Only Earth Station registrations for our clients. One of the cold draconian facts of this process is the filing fee. Not only is the commission asking C-band receive only users to stand up and be counted, but the bean counters are collecting $435.00 per registration for the privilege.

Not all C-Band users are commercial operators. There are a large number of common folk that still watch Free TV via "The C-band Birds." That filing fee is more than some families spend on food for a month. These people want their entertainment protected also. Laying down that kind of cash becomes a big burden for many.

Many C-Band users feel the fee will buy them some protection from the Wireless Network operators. Past FCC enforcement actions have proven, there will be no protection from interference. **Interference is going to happen when a weak**

signal system and a robust wireless system attempt to share the same spectrum.

Here are real world examples that the FCC created and had to fix. In 2013, the Commission allocated additional spectrum for unlicensed use in the 5 GHz band and established the Unlicensed National Information Infrastructure (U-NII) rules. FCC 13-22

U-NII devices are wireless networking systems of a simple nature particularly to provide wireless local area networking and broadband access.

U-NII providers were given "rules" authorizing them to operate wireless devices in the 5.15-5.35 GHz, 5.47-5.725 GHz, and 5.725-5.825 GHz bands on an unlicensed basis. Also, they had to comply with the technical rules specific to U-NII devices to prevent interference. Show me a computer networking person who actually read the FCC rules before they got the call from the FCC Enforcement Bureau.

Guess what is in that center chunk of spectrum, 5.47-5.725 GHz? The most important weather radar network in the United States is the Terminal Doppler Weather Radar (TDWR). Its primary use is detecting weather that is hazardous to aircraft taking off from and landing at major air terminals. TDWR keeps planes safe from

microbursts and wind shear. TDWR operates in the 5.60-5.65-GHz segment, right in the middle of the then new, un-licensed wireless playground.

Many U-NII operators were un-educated about TDWR. The Enforcement Bureau put out a warning. Computer networking people do not read the FCC digest. The FCC then had to clean house issuing, as an example, a $202 thousand dollar enforcement action. FCC 13-109 was published August 6, 2013, it's a good read. It is also an example of the thousands of man hours by the Enforcement Bureau cleaning up the mess.

The TDWR radar system uses a powerful pulsed transmitted signal and listens for a very weak echo back from rain drops in the weather near major airports. **Interference is going to happen when a weak signal system and a robust wireless system attempt to share the same spectrum.**

Let's explore a few other past examples of why a weak signal service cannot share the same spectrum with a robust land based service.

C-Band Satellites are in geo-synchronous orbit, which means in layman terms, the satellite stays in the sky locked with the rotation of the earth. For this to take place the satellite has

to be 23,000 miles above the earth's equator. The weak incoming signal requires a large earth-based parabolic antenna to help amplify the signal. The system currently in place works well and is very reliable even in bad weather. Currently there are very few land based devices to interfere with the weak satellite delivered signal. **Interference is going to happen when a weak signal system and a robust wireless system attempt to share the same spectrum.**

LightSquared Subsidiary LLC, wanted to repurpose the spectrum of a satellite cell like phone system into a land-based computer network delivery system. IB Docket 11-109 is a good place to start reading. Unfortunately, this proposal has the GPS satellite system right next door. LightSquared was looking good until the Military and the NTIA woke up to how LightSquared would overload the most common GPS devices. GPS satellites are 12,000 miles above the earth. Again, the land-based wireless network device would be a robust signal compared to that weak GPS signal delivered from 12,000 miles away. **Interference is going to happen when a weak signal system and a robust wireless system attempt to share the same spectrum.**

Many voices said the GPS system was too perfect to fail. But it has, from land-based interference, intentional and un-intentional. There are stories of the Navy playing war games

off the California coast unintentionally shutting down GPS based devices on land.

A construction worker who was unhappy about the GPS tracking device his boss had installed on his company truck, fought back with a GPS jamming device. The robust land-based (truck) signal from the jammer took out the weak satellite delivered signal. Also the enhanced GPS landing system at Newark Liberty International Airport went down. This turned into an FCC enforcement action, if you would like to read more, FCC 13-106. **Interference is going to happen when a weak signal system and a robust wireless system attempt to share the same spectrum.**

Clarity Media Systems, LLC, aka: "Trucker TV", DA 06-1664. Clarity wanted to re-purpose part of the 2.025 GHz to 2.110 GHz, TV Broadcast Auxiliary Services (BAS) band. Clarity wanted in-cab wireless cable TV at over 200 Flying J travel plazas. This 2.0 GHz band is the spectrum where TV stations use very sensitive receiving system to receive low power transmitters from helicopter or trucks up to 100 miles out from the main TV studio.

Negative comments rained in from every TV station in the United States. The Commission eventually killed the plan. **Interference**

is going to happen when a weak signal system and a robust wireless system attempt to share the same spectrum.

History has a very strange way of repeating itself. With the swipe of a bureaucratic pen, you can disregard history, attempt to violate the laws of physics and write all the federal rules no one will ever read. Media delivery via C-Band satellites has been a 30 year success.

By_____

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